

CLAIMS:

1. A process for the preparation of a Grignard compound, said process comprising reacting an organic halide and magnesium metal in a solvent in the presence of a transition metal catalyst and an additional catalyst component, said transition metal catalyst comprising a transition metal selected from Periodic Table groups 3, 4, 5, 6, 7, 8, 9, 10 or 11, and one or more elements selected from groups 14, 15, 16 or 17 bonded to said transition metal, and said additional catalyst component comprising a compound of a metal of Periodic Table groups 1, 2 or 13, and one or more elements of Periodic Table groups 14, 15, 16 or 17 or hydrogen bonded to said metal of Periodic Table groups 1, 2 or 13.
2. The process according to claim 1, wherein said organic halide is selected from the group consisting of aromatic chloro compounds, chlorine-containing heterocycles and functionalized aromatic or heterocyclic chlorine compounds.
3. The process according to claim 1, wherein an ethereal solvent is used as said solvent.
4. The process according to claim 3, wherein tetrahydrofuran, monoglyme or diglyme are used as said ethereal solvent.
5. The process according to claim 1, wherein said transition metal catalyst contains Fe, Mn, Co or Cu.
6. The process according to claim 1, wherein one or more elements selected from the group consisting of the elements Cl, Br, I, O, N and C are bonded to said transition metal.

7. The process according to claim 6, wherein C, N or O are bound to the transition metal in the form of an alkyl or aryl group or a metallocene complex, or in the form of an amide or phthalocyanine, or in the form of an alkoxy or aryloxy group.
8. The process according to claim 1, wherein an iron or manganese halide is used as said transition metal catalyst.
9. The process according to claim 1, wherein a Li, Na, Mg, B or Al compound bound to a hydride, halogen, alkyl, aryl, alkoxy, aryloxy, amido or phthalocyanine group is used as said additional catalyst component.
10. The process according to claim 9, wherein an organomagnesium halide is used as said additional catalyst component.
11. The process according to claim 10, wherein said organomagnesium halide is formed in situ from an organic halide and excess magnesium.
12. The process according to claim 11, wherein an alkyl or aryl halogen compound is used as said organic halide.
13. The process according to claim 12, wherein the molar ratio of organic halide to transition metal catalyst is $> 0.2 : 1$.
14. The process according to claim 13, wherein said molar ratio is at least $1 : 1$.
15. The process according to claim 1, wherein one or more cocatalysts are additionally employed.
16. The process according to claim 15, wherein anthracene or a substituted anthracene or an Mg adduct thereof and/or a halide of a Periodic Table 1st and 2nd main group metal and/or an ammonium halide and/or an organoammonium halide are employed as said cocatalyst.

17. The process according to claim 16, wherein an Mg or Li halide is employed as said cocatalyst.
18. The process according to claim 17, wherein a magnesium halide formed in situ is employed as said cocatalyst.
19. The process according to claim 1, wherein the reaction is performed at temperatures of up to the boiling temperature of the solvent employed.
20. The process according to claim 1, wherein said magnesium metal is used in the form of turnings, raspings, granules, chips, dusts or powders.
21. The process according to claim 20, wherein said magnesium metal is used as a finely divided powder.
22. The process according to claim 20, wherein said magnesium metal is activated, prior to being used, by grinding, agitating or cutting processes, ultrasonication, heating in a vacuum, or by the addition of activating agents.
23. The process according to claim 22, wherein said magnesium metal is activated by the addition of iodine.
24. The process according to claim 20, wherein said magnesium metal is activated, while the reaction is performed, by grinding, agitating or cutting processes or ultrasonication.